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ABSTRACT

The transition from pre-linguistic to linguistic communication was investigated in the acquisition of pronouns in American Sign Language (ASL). Data were obtained from a congenitally deaf child learning ASL as a first language from deaf parents. Longitudinal data from the age of 6 months to 2 years and pronoun elicitation task data were analyzed. The purpose of the analysis was to determine how early pointing gestures come under grammatical control, the learning process for personal pronouns in ASL, and the developmental relationship between pre-linguistic gestures and linguistic expression. It was observed that the child's acquisition of personal pronouns resembled that of hearing children despite the differences in modality that would be expected to facilitate the sign process in relation to spoken language. A discontinuity was noted between pre-linguistic and linguistic knowledge, indicating a restructuring and reorganization of gesture processing during ASL acquisition. It is concluded that linguistic knowledge of ASL is not merely constructed out of available pre-linguistic material. (RW)

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From Gesture to Symbol: The Relation Between Form and Meaning in the Acquisition of Personal Pronouns in American Sign Language

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1.0 Introduction

Traditional models of child language acquisition differ with respect to what is assumed about the knowledge underlying acquisition and how this knowledge changes over time. In one view (the interaction-based models), language is seen as a part of the child's general cognitive capacity (e.g., Bates, 1976; Bruner, 1975; Piaget, 1955). Linguistic structures are regarded as derivative of general cognitive structures, rather than reflecting a specific linguistic capacity. Language is "built up" from both the child's interaction with the environment and her pre-linguistic knowledge of relations among objects and events. Given the richness of the child's experiences, and the close relationship between linguistic and pre-linguistic forms of knowledge, the child's own contribution is thought to be restricted to general learning mechanisms.

In a second view (the child-based models; Shatz, 1982), language emerges from knowledge structures specific to language; these constitute a distinct task-specific mental capacity (e.g., Chomsky, 1965; Gleitman, 1981). Language is seen as qualitatively distinct from the child's pre-linguistic knowledge of the world. Further, the child is assumed to possess an innate knowledge of the possible forms of human languages (so-called universal grammar), and her task is to infer the structure of the particular language to which she is exposed. This view emphasizes the child's contribution to the acquisition process--through its biologically given linguistic capacity--while minimizing (although not eliminating entirely) the role of experience.

These models of language acquisition lend themselves to testable hypotheses about the language acquisition process. The interaction-based models imply that the child's transition from pre-linguistic communication to linguistic competence should be relatively smooth. That is, if linguistic structures are derived from pre-linguistic forms, there should be no abrupt discontinuity in the use of these differing forms. On the other hand, if language is a distinct formal system reflecting a particular mental capacity, not wholly built up from early communicative competence, one would predict a discontinuous transition from early pre-linguistic to linguistic expression. That transition would be marked by evidence of the reorganization of knowledge regarding the function and use of linguistic forms once they become part of a formal grammatical system.

The main objective of the present study was to obtain empirical evidence bearing on these positions. The transition from pre-linguistic to linguistic communication was investigated in the acquisition of pronouns in American Sign Language (ASL). Studying this issue in the

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context of the acquisition of a signed language provides a unique methodological advantage in that both pre-linguistic and linguistic forms reside in the same modality. In particular, personal pronouns in ASL (i.e., I, you) have the same form as both the paralinguistic pointing gestures which commonly accompany speech and the pre-linguistic pointing gestures observed in young hearing children. With a single modality, and external articulators, the developmental process can be observed directly over time.

Personal pronouns belong to the class of "deictic" (or indicating) terms whose meanings change depending upon who is actually speaking at any given time in the discourse context. Thus, they have been said to have "unstable" or "shifting" referencing properties, while most other words have "stable" referencing properties (Jakobson, 1957).

Three noteworthy features characterize the hearing child's acquisition of pronouns: (1) Pronouns are acquired in a particular order. Beginning around 16-18 months the pronoun me enters, followed by you around 22 months, and then 3rd person pronouns (e.g., Charney, 1978; Clark, 1978). (2) During this process, some children will avoid using me and use full proper nouns instead (e.g.,"Billy do X" instead of "I do X"). (3) Around the time when you enters the child's lexicon some children have been observed to engage in pronoun reversal errors. For example, mother might say to the child "Do you want to go to the store?" and the child's reply would be "Yes, you want go store." Here the child uses you incorrectly to refer to herself rather than to mother. Similarly, the child may understand and produce me to refer to the adult rather than to herself; although symmetrical you-me error pairs do not necessarily co-occur in time. Initially, these children appear to regard pronouns as having fixed or stable referents (i.e., you=child and me=adult) rather than having changing or "unstable" referents depending upon the speaker role (Charney, 1978; Chiat, 1982; Clark, 1978).

These findings suggest the following questions about the acquisition of pronouns in ASL: (1) How do early pointing gestures come under grammatical control? That is, how does the child move from the early biologically given, unconstrained and communicative use of pointing gestures to the use of pronominal pointing constrained by the grammatical conventions of the language? (2) What is the developmental relationship between pre-linguistic communicative gestures and linguistic expression? Specifically, is the acquisition of linguistically-governed pointing facilitated by the child's knowledge of its extra-linguistic communicative functions. (4) Finally, given the seemingly transparent meaning of you and me pronouns in ASL, will deaf children learn these relations at an accelerated rate and in an error-free manner?

2.0 Method

The subject was a third generation profoundly and congenitally deaf girl who was learning ASL as a first language from her deaf parents. The child was of normal intelligence and was free of other neurological and physical handicaps. Two types of data were obtained in this study: longitudinal data from 0;6 to 2;3 and experimental data from pronoun elicitation tasks at age 1;11.(1)

1. Longitudinal data: The child was videotaped for 8 one-hour sessions in free conversation with her parents; taping occurred approximately once every nine weeks.
2. Pronoun elicitation tasks: Production and comprehension of personal pronouns were evaluated using tasks adapted from those used with hearing children by Charney (1978) and Chiat (1981). First, the child's ability to recognize and identify referents was tested with a series of pictures of common objects. Then, three pronoun tasks were administered. They involved: (1) pictures of familiar and unfamiliar people (including the experimenter, child and her parents); (2) an action task involving a bag filled with family possessions and (3) a hiding-box task where the child had to find grapes under a specified picture. During each task the child was asked a series of questions to determine her comprehension of proper nouns and pronouns, and to encourage her production of pronouns.

Videotapes were transcribed for adult and child signing with contextual information. Reliability checks on the transcriptions of four videotapes were done by two native deaf signers. Their judgments showed 95% agreement with my own.

3.0 Results

Early Period: 0;6 and 0;10- At 0;6 the child did not point, but did show the normal reaching and grasping behavior typical of hearing children at this age. At 0;10 she pointed to things around her, at times to direct mother's attention to objects and locations (with eye gaze to adult; N=76), and at other times to privately investigate objects (without eye gaze; N=20). Of particular significance was the child's communicative and unambiguous pointing gestures to herself (N=12) and to other people (N=7).

Middle Period: 1;0 to 1;6- During this period, one semantic function of the child's pointing gestures disappeared completely from her lexicon. She stopped pointing to refer communicatively to people such as mother, father, and herself, but continued to use pointing for general deictic referencing to objects, locations, and events around her. Figures 1 and 2 represent the percentage of the child's total number of pointing forms per session which were directed to herself and addressee, and the relationship between the child's use of these pointing forms to that of her general deictic pointing to denote objects and locations (labelled "non-objects" on graphs) over time. Several types of data were obtained to determine if the child's seemingly selective avoidance of self-other referencing resulted from a general language deficit. First, there was an increase over time in sign and combination types (figure 3). Second, the child's Mean Length of Utterance (MLU) steadily increased during the 12 to 18 month period, and there was an increase in the number of signs used in combination versus signs used alone. Thus, by these measures the child's language was developing normally compared to that of other hearing and deaf children.

During the period when the child was not using the YOU and ME pronoun points (no occurrence of these forms in the 308 utterances during this 6 month period), she did refer to herself and people around her by using full proper nouns. She signed MOTHER, FATHER, and GIRL in linguistic contexts that would have otherwise required pronouns. Finally mother produced YOU and ME pronouns more during this period .

Error Period: 1;10 to 1;11- At 1;10 the child began pointing to people again but in a manner which appeared to be different from adult usage: she pointed to people occupying second person role for the first time using the YOU sign, but the sense of the pointing sign appeared to mean ME. This interpretation is based on three types of evidence: (1) the formational difference between the YOU form and general deictic pointing (the former was formed within the signing space with a bent elbow and eye gaze fixed on the addressee and thus, was formationally similar to her other lexical signs; the latter was signed outside of the signing space with a straight elbow and eye gaze directed to the point's locus); (2) total absence of the ME form, yet she seemed fully aware of herself and used YOU in contexts that otherwise required the pronoun ME; (3) contextual information, including mother's responses. For example, in one instance the child used YOU to indicate herself while signing to mother that she (the child) wanted to eat. Because the actual form of the child's utterance carried the meaning that mother should eat, mother responded by telling the child that she (mother) was not hungry and would eat later. The child, appearing disturbed over the misunderstanding, dragged her food-bag from across the room to mother's feet and repeated the sign EAT.

Pronoun Elicitation Tasks: 1;11- These tasks elicited 26 YOU=ME production errors, and 18 comprehension contexts were isolated. The results raised questions about the precise nature of the production errors. First, was the child merely imitating mother's utterances? Did the mother sign YOU to the child immediately prior to the child's errors? The answer was clearly no. In only 3 instances was the child's YOU preceded by the mother's YOU. Second, were the production errors restricted to a particular grammatical class of utterances in the child's lexicon (routine or syncretic, unanalyzed forms, such as "Iwanna")? The constructions did not show such a pattern: 15 were without the WANT verb, while the 11 with the WANT verb were not in a fixed order (5 WANT YOU and 6 YOU WANT). Finally, was the child's pronoun error susceptible to mother's correction either by molding or other means? The possibility of phsyical molding of the language articulators in signed languages (i.e., the hands), might be thought to give deaf children a distinct advantage. In fact, the child's errors persisted despite mother's deliberate attempts to physically mold the child's YOU into the ME sign, suggesting that (a) the child cannot be forced to imitate linguistic forms that she is not yet able to analyze within her emerging grammatical system and (b) there is a resistance to environmental influence on the acquisition of certain grammatical forms irrespective of the mode of language transmission.

The comprehension tasks revealed that the child generally understood the ME pronoun as used by adults to have have multiple referents and to refer to themselves (the adults), rather than to her (the child). She always comprehended the adult's YOU to mean her (the child).

Correct Use of Personal Pronouns: 2;3- At 2;3 the child produced and comprehended the full set of personal pronouns spontaneously and without errors. She produced ME in self reference and YOU to refer to mother and father.

4.0 Discussion

These results present two immediate questions. First, given the child's rich and continued use of deictic pointing, why does a selective function of the pointing form drop out? Second, given that the form of the symbol is very transparent relative to its meaning, why does the child make these errors?

4.1 Why does a selective function of the pointing form drop out?

Previous studies of language acquisition in hearing children invoke the notion of the child's avoidance of certain phonological and grammatical constructions (e.g., Ferguson & Farwell, 1975). Children will avoid the use of certain words containing sounds that they find difficult to articulate. What is unique about the "avoidance" behavior observed in the deaf child in this study is that she avoided a particular function of pointing, rather than a particular linguistic form. The child is able to articulate this form; she appears to avoid this particular function because of its grammatical function.

Slobin (1982), for example, suggests that hearing children are biased towards relating one meaning (or concept) to one word-like surface form. In ASL, pointing enters into the language in a number of ways: (1) as a primary phonological unit, (2) as a primary component of the anaphoric referencing system, (3) as comprising one subset of the class of morphological forms called classifiers, (4) as personal pronouns, (5) as full deictic terms within the grammatical system of ASL, and (6) as paralinguistic gestures. Thus, pointing in ASL represents a single surface form with complex underlying grammatical functions, and can be viewed as similar to linguistic forms in languages with fusional morphological units.

On this basis, one might expect the child to avoid the use of the pointing form entirely, until its various meanings and functions can be understood. The obvious explanation for the selective avoidance, however, is simply that pointing has such a pervasive function in the language that its use cannot be avoided entirely. But why, among the various linguistic functions of pointing, does the child specifically avoid first and second person pronominal pointing? In contrast to the other lexical items in the child's vocabulary, the referent of a pronoun shifts depending upon the speaker. In addition, the use of pronouns is constrained by other grammatical processes (e.g., strict co-referencing rules). Finally, the child has an alternate means for communicating the same information, namely through the use of full lexical nouns. Thus, confronted with the pluri-functionality of pointing in the language, and the conceptual complexity of pronominal referencing, the child avoids YOU and ME pointing in favor of simpler lexical items. In this sense, the child can be said to be "avoiding" indexical pointing in favor of forms which remove any ambiguity.

4.2. Why does the child make pronoun errors?

In this section it is proposed that the child's YOU sign is a non-reciprocal, non-deictic, "frozen" lexical sign that stands for her, and her alone. In short, it is her name, rather than a pronoun. Further, it is proposed that the child did not have pronouns in her productive lexicon at this time. This analysis shares with Clark (1978) the notion that the child has formed the erroneous hypothesis that the YOU pronoun is her name. Clark suggests that children produce these

errors because they fail to take on the perspective of the adult. I propose, however, that the child had to shift to the adults' perspective to have produced the YOU=ME error in the first place. Further, the incorrect meaning that the child has attached to the YOU form is a problem related to learning the structure of the linguistic system, not the by-product of a general cognitive deficit.

The derivation appears to be the following: the child's error occurs at a time when she has clearly begun to understand the symbolic relationship between a sign and its referent, when her vocabulary is growing rapidly and her MLU is steadily increasing. At the same time, the frequency and distribution of her deictic points have begun to decline, replaced by full lexical nouns. The child observes other people using the YOU form to refer to her. Regardless of who is signing, the referent is the same (i.e., her). Thus, drawing upon her knowledge of sign-symbol correspondences, she hypothesizes that the YOU point is a symbol referring to herself, that is, a name sign. In effect, she is applying the sign-symbol schema that works for other nouns to the YOU point. That is, she has <u>over-symbolized</u> the indexical YOU point, treating it as a frozen lexical item with a stable referent, herself.

This analysis makes clear the fundamentally linguistic nature of the error. The child has grasped a basic fact about linguistic systems, namely the abstract relation between linguistic forms and their meanings. Rather than indexing particular objects in the world, these linguistic forms have intensional content; that is they denote meanings or concepts rather than particular objects. The sign SHOE, for example, does not index a particular object, but rather stands in an abstract relation to a class of items. The child's initial hypothesis about the meaning of YOU is that it is a symbol of this type: YOU refers to herself in the manner that SHOE refers to shoes. She consistently observes people using this form to refer to herself. Unfortunately, the correct, adult use of the sign in ASL, <u>is</u> in fact indexical. In hypothesizing that YOU is the lexical item referring to herself, the child ignores the indexical information provided by the form of the sign. Thus, the symbolization principle takes precedence, resulting in an error when applied to indexical signs.

Rather than reflecting a general cognitive deficit related to perspective-shifting, the YOU=ME error derives from the over-application of an abstract linguistic principle. The error is striking because the child ignores transparent, perceptually-salient information which she used to communicate pre-linguistically, and which she continues to use deictically. This information is ignored in favor of a symbolization process that <u>increases</u> the abstractness of the relationship between form and meaning.

Two facts would count as evidence against the hypothesis that the child regards YOU as her name for the reasons specified above: (1) if during the error period the child produced the YOU form to refer to someone other than herself, or (2) if she comprehended the YOU form as referring to another person when she was not the addressee but an onlooker in a conversation between two adults. Both of these points cannot be supported by these data.

The final puzzle concerns the asymmetrical nature of the child's

production error. The explanation appears to be as follows: when the child signs YOU to intend ME, it always has a single referent, the child. She does not sign ME, because she already has a form to represent this--the YOU sign. In addition, ME always means other people (but not their names). Since her YOU sign seems to function as a noun denoting herself, it might be expected that she would fail to use ME simply because pronouns are not part of her productive lexicon at this time.

5.0 Conclusion

It should be clear, then, that the child's problem is a linguistic one, related to understanding functions of pointing in the language. In mastering the use of personal pronouns, the child in this study moved from interpreting pronominal pointing gesturally, to interpreting them lexically, to understanding them as part of a grammatical system. Use of pronominal pointing was not simply "built up" out of the pre-linguistic pointing gestures. This is particularly surprising given that ASL is constructed in such a way as to permit a simple transition between pre-linguistic pointing gestures and the use of personal pronouns. However, the idea that gestures can function as linguistic symbols is so powerful that it overrides the transparent indexical information that pointing provides.

This child's acquisition of personal pronouns resembles that of hearing children, despite radical differences in modality that would otherwise be expected to facilitate the sign process compared to spoken language. Thus, this phenomenon may provide insight into universal aspects of pronoun acquisition.

The child's avoidance of the personal pronouns, together with the errors that occur as they are introduced, provide telling evidence related to theoretical questions concerning reorganization of knowledge structures in development, and certain discontinuities between linguistic and non-linguistic systems (Bowerman, 1982). The child shifts from conceptualizing person pointing as part of the class of deictic gestures to viewing them as elements within the grammatical system of ASL. The child's initial hypotheses concerning their function within the grammar are incorrect, and must be revised. The comprehension and use of certain simple indexical pointing gestures were temporarily lost during this time. Thus, the disturbance in the processing of these seemingly transparent gestures provides compelling evidence for restructuring of the child's knowledge. The cognitive and neurological basis for this reorganization is unclear, and needs to be investigated further. However, the existence of the phenomenon of reorganization cannot be doubted, and data from this study may provide support for current modularity theories of language acquisition (e.g. Fodor, 1983).

It cannot be said that there is no relation between pre-linguistic and linguistic knowledge, or that language acquisition is unrelated to cognitive development. It can be said, however, that linguistic knowledge--concerning, for example, the relationship between form and meaning--is not merely constructed out of the pre-linguistic materials at hand. In this sense, the acquisition process is discontinous with other forms of knowledge.

Footnotes

1. A complete report of this study appears in Petitto L. A. From gesture to symbol: The acquisition of personal pronouns in American Sign Language. Unpublished Qualifying Paper, Harvard University, 1983.

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